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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/705,679	11/03/2000	Takeshi Nishimura	4296-124	6276

7590

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EXAMINER

WACHTEL, ALEXIS A

ART UNIT	PAPER NUMBER
1764	

DATE MAILED: 12/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/705,679

Applicant(s)

NISHIMURA ET AL.

Examiner

Alexis Wachtel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 August 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Detailed Action

Response to Amendment

1. Applicant's amendment and accompanying Remarks filed 8-24-04 have been entered and carefully considered.

The amendment is insufficient to overcome the obviousness rejections of claims 1-11. Rejection of claim 11 by way of 35 U.S.C. 112 and 35 U.S.C. 101 by the present amendment.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,256,783 to Takada et al in view of US 4,436,146 to Smolarek and US 4,142,581 to Yoshitomi et al.

Takada et al disclose a shell and tube type reactor comprising:

Per claim 1: a shell in which a plurality of reaction tubes are held with a first tube sheet (Fig.1, item 4) and a second tube sheet (Fig.1, item 5) in the reactor; a raw material inlet (Fig.1, item 28) equipped in the first tube sheet side of the shell; a product outlet (Fig.1, item 29) equipped in the second tube sheet side of the shell; an intermediate tube sheet (Fig.1, item 10) provided horizontally in the shell. Examiner notes that intermediate tube sheet partitions a plurality of chambers. Examiner notes

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that migration of heat medium is suppressed between chambers is suppressed due to intermediate tube sheet.

With respects to claims 1-3, Takada et al fail to teach wherein the reaction tube is expanded to three grooves formed in the reaction tube-fixing part of the intermediate tube sheet for substantially shielding spaces between the tubes and the intermediate tube sheet and for forming plural of chambers. Yoshitomi et al teach a tube-hole for an expanded tube to tube sheet joint which is formed by expanding the tube securely in the tube hole by means of a tube expander and still attains greater bond strength and water tightness at the joint than in conventional joints (Col 1, lines 56). The tube-to tube sheet joint is attained by providing a tube hole structure having at least one circumferential groove on the surrounding wall of each hole of a tube sheet in which each tube member is radially expanded to give a tube to tube sheet joint (Col 1, lines 57-61). (The Examiner notes that Yoshitomi et al clearly enables for two or more grooves). Per Fig.3, 1A illustrates a groove, 2 illustrates a tube, and 1 illustrates a tube sheet. In view of this teaching it would have been obvious to one of ordinary skill to have used a tube sheet sealing means using one, two or three grooves formed in the tube sheet. One of ordinary skill would have been motivated by the desire to improve the bond strength and water tightness of the tube-sheet joint with the tube.

With respects to claims 1 and 5, Takada et al fail to teach an expansion joint formed around the periphery of each of the chambers and wherein the expansion joint is roughly semicircular, with the inner face of the joint directed toward the inner side of the

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reactor and the upper and lower ends of the joint connected to the almost horizontally cut shell of the reactor. Smolarek teaches the use of expansion joints in reactor shells for the purpose of reducing the tensile or compressive loading between tube sheets and the reactor shell resulting from either the internal pressurization of the reactor shell or the existence of a pressure gradient between the tube and shell which would tend to cause an unequal expansion or contraction there between (Col 8, lines 5-14). In view of this teaching it would have been obvious to one of ordinary skill to have included expansion joints as disclosed by Smolarek in the region between the tube sheet (for both first and second tube sheets) and reaction shell motivated by the desire to improve the structural integrity of the resulting reactor. Examiner notes that expansion joints are capable of absorbing distortion by increase/decrease of heat).

Per claim 4: wherein a number of the chambers formed is two (Fig.1, items A and B) which define an upper and lower chamber. Chambers are capable of functioning at different temperatures.

With respects to claim 6, the references as set forth above fail to teach wherein the amount of water migrating from the upper chamber to the lower chamber fulfills the relation, amount of leakage (ml/hour per reaction tube) $< \text{or} = 1.27 \times 10^{-5} \times \text{pressure difference (Pa)}$, in a hydraulic test. However, given that Yoshitomi et al teaches the use of the same tube sheet/tube sealing means, it is fairly reasonable to assumed that the apparatus of the prior art would leak just as much or less than claimed.

With respects to claim 7, the references as set forth above fail to teach wherein the amount of water migrating from the lower chamber to the upper chamber fulfills the

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relation, amount of leakage (ml/hour per reaction tube) $\leq 1.27 \times 10^{-5} \times$ pressure difference (Pa), in the hydraulic test. However, given that Yoshitomi et al teaches the use of the same tube sheet/tube sealing means, it is fairly reasonable to assumed that the apparatus of the prior art would leak just as much or less than claimed.

Per claim 9: A reactor further comprising a circular conduit for transferring a heat medium around the reactor. Examiner notes that nozzles 21 and 15 in Fig.1 of Takada et al are considered circular conduits are facilitate the transfer of a heat medium around the reactor.

Per claim 8: A reactor further comprising a baffle plate substantially horizontally disposed in the reactor (Takada et al, Fig.1, item 27).

Per claim 10: wherein different kinds of reactions are performed. The Examiner notes that the reactor disclosed by Takada et al is not limited to one specific reaction, but can be used in numerous different types of catalytic vapor phase oxidation reactions.

Per claim 11: A method for producing (meth)acrylic acid by the reaction of catalytic gas phase oxidation using a reactor set forth in claim 1. Since Takada et al generally teaches the use of the disclosed reactor in catalytic vapor phase oxidation reactions, it is reasonable to assume the reactor is readily capable of being used for producing (meth)acrylic acid and one of ordinary skill would have employed the reactor as disclosed by the prior art for contacting propylene containing gas or isobutylene containing gas with catalyst since the reactor is readily useful for such a utility.

Arguments

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4. Applicant argues that Takada et al does not disclose or suggest a substantially shielded structure between tubes and intermediate tube sheet partitioning a plurality of chambers and an expansion joint formed around periphery of each of chambers as defined by present claims. Expansion joints are clearly taught by Smolarek. Such expansion joints are desirable for the purpose of reducing tensile or compressive loading between tube sheets and the reactor shell. Smolarek is analogous to Takada et al since both references are concerned with reactors. Additionally, grooves formed in accordance with the teachings of Yoshitomi et al on the reactions tubes enables for a shielded structure between tubes and intermediate tube sheet. Yoshitomi et al is considered analogous art since Yoshitomi et al and Takada et al are both broadly concerned with the attenuating the flow of fluids from one to a second chamber chamber.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alex Wachtel whose telephone number is 571-272-1455. The examiner can normally be reached on 10:30am to 6:30pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Glenn Caldarola, can be reached at (571)-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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